

18th International Workshop on Laser Ranging  
11-15 November 2013, Fujiyoshida, Japan

# Recent Progress and Future Perspectives of the International VLBI Service for Geodesy and Astrometry (IVS)



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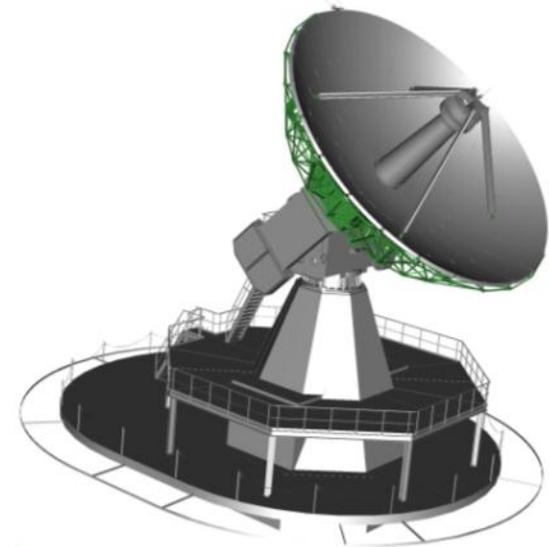
and

many colleagues of the IVS



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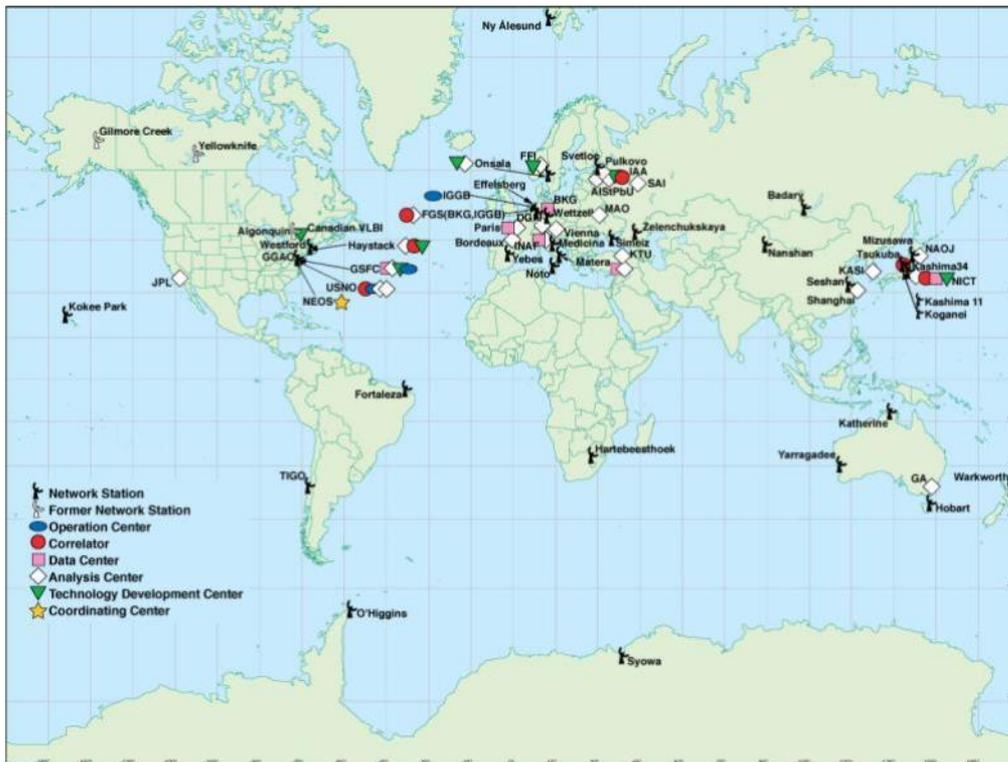
1. Overview of IVS and VLBI2010
2. VGOS progress in the world
3. VGOS project in Japan
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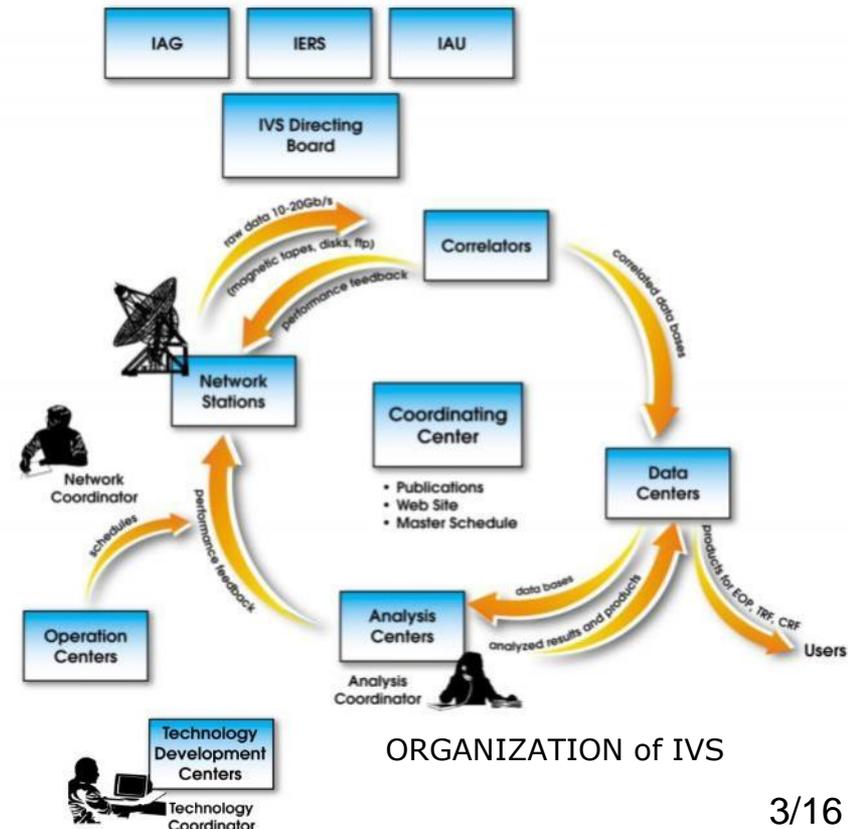
# International VLBI Service for Geodesy and Astrometry



- Established in 1999 under IAG and IAU
- 83 Permanent Components, representing 43 institutions in 21 countries



COMPONENTS MAP



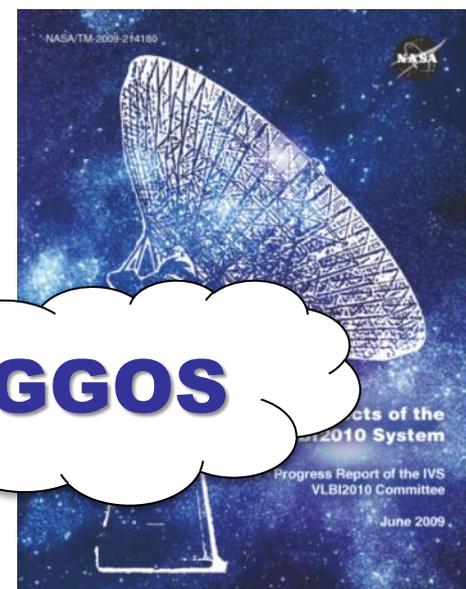
ORGANIZATION of IVS

# VLBI2010

- IVS WG3: started discussion on the next generation VLBI (2005~).
- VLBI2010 Committee: considered the concrete system for VLBI2010.
  - Final report (2009) “*Design Aspects of the VLBI2010 System*”
- System for VLBI2010 contains;
  - ① 12-m diameter dish & 12°/s fast moving
  - ② 2~14GHz broad-band receivers
  - ③ High speed sampler, Digital Backend

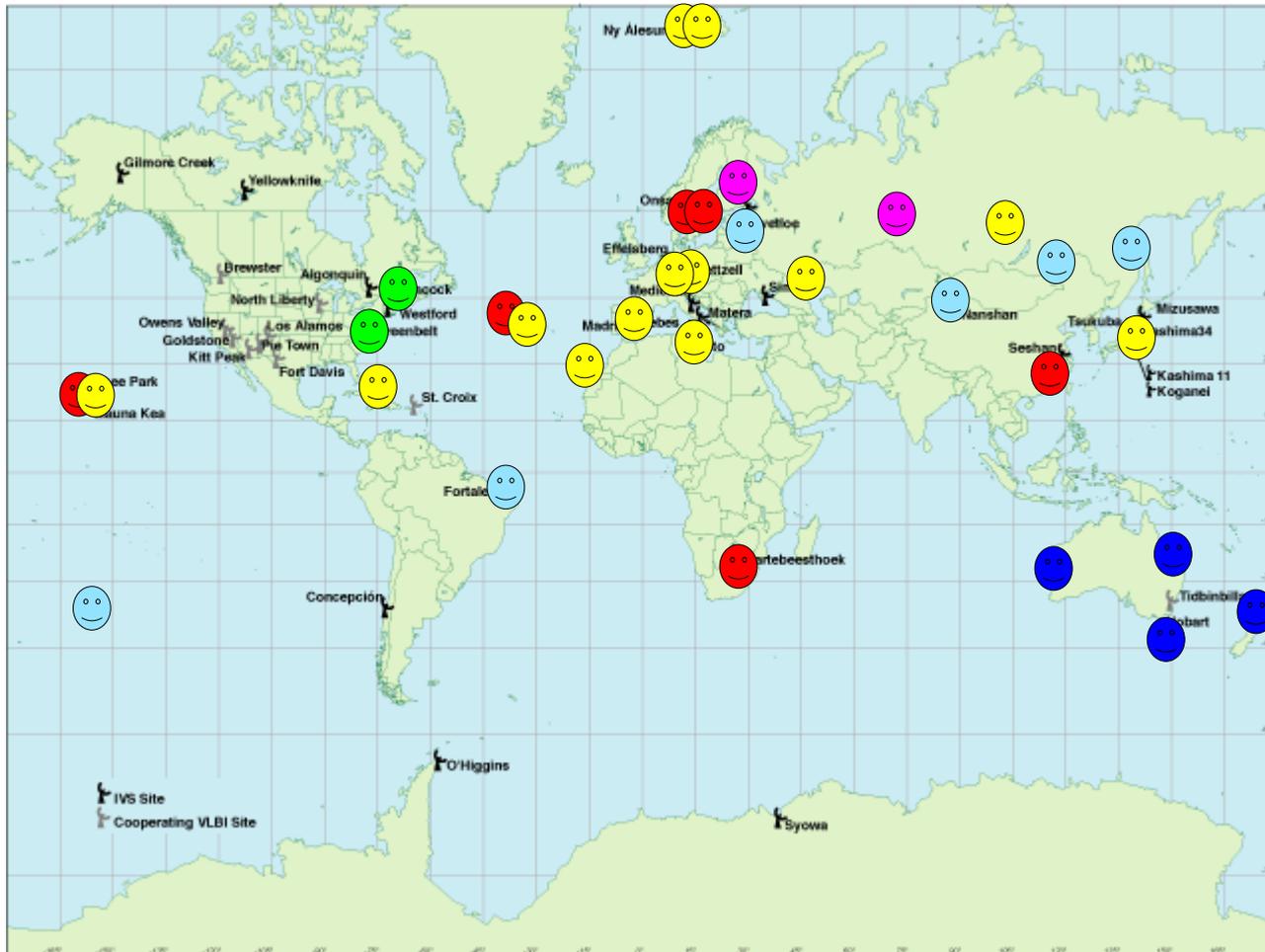
## VGOS

## VLBI Global Observing System



GGOS

# VGOS World



## Degree of progress of VGOS

-  operational(broad-band)
-  under construction or just before operation
-  funded
-  proposal submitted
-  planning phase
-  operational (legacy S/X ) to be upgraded

based on available information September 2013 by H. Hase, V2PEG

# New VGOS telescopes



Ny-Ålesund  
(Svalbard, Norway)  
Courtesy L. Langkaas



Ishioka (Japan)



Zelenchukskaya (Russia)  
Courtesy  
A. Ipatov

Hobart  
(Australia)  
Courtesy  
D. Behrend



# RAEGE, Spain



Gómez-González et al .(2013)



Santa Maria (Eastern Azores)  
(August 2013)



Yebes  
(August 2013)  
Courtesy: J.A. Lopez



February 27, 2013

# Twin Telescope Wettzell, Germany



Inauguration in April 2013

Courtesy A. Nothnagel

# Onsala Tvilling Teleskop, Sweden



# VGOS Station in Japan

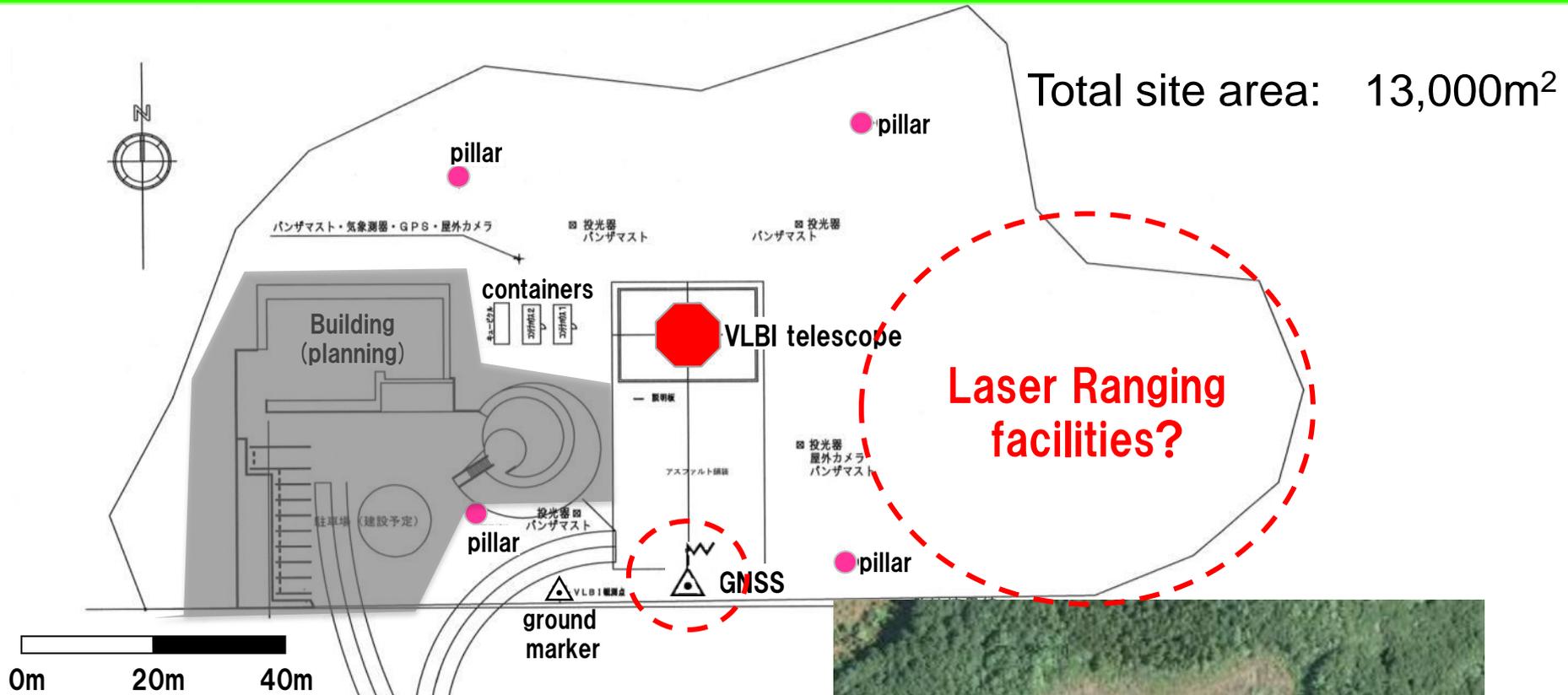
- FY2011~FY2013
  - 13.2-m telescope
  - Broadband front-end (feeds, receivers)
  - Hydrogen masers
  - Up-down convertor
  - Data acquisition system (Sampler, storage, ...)
  - 10Gbps network



# Ishioka Geodetic Observing Station



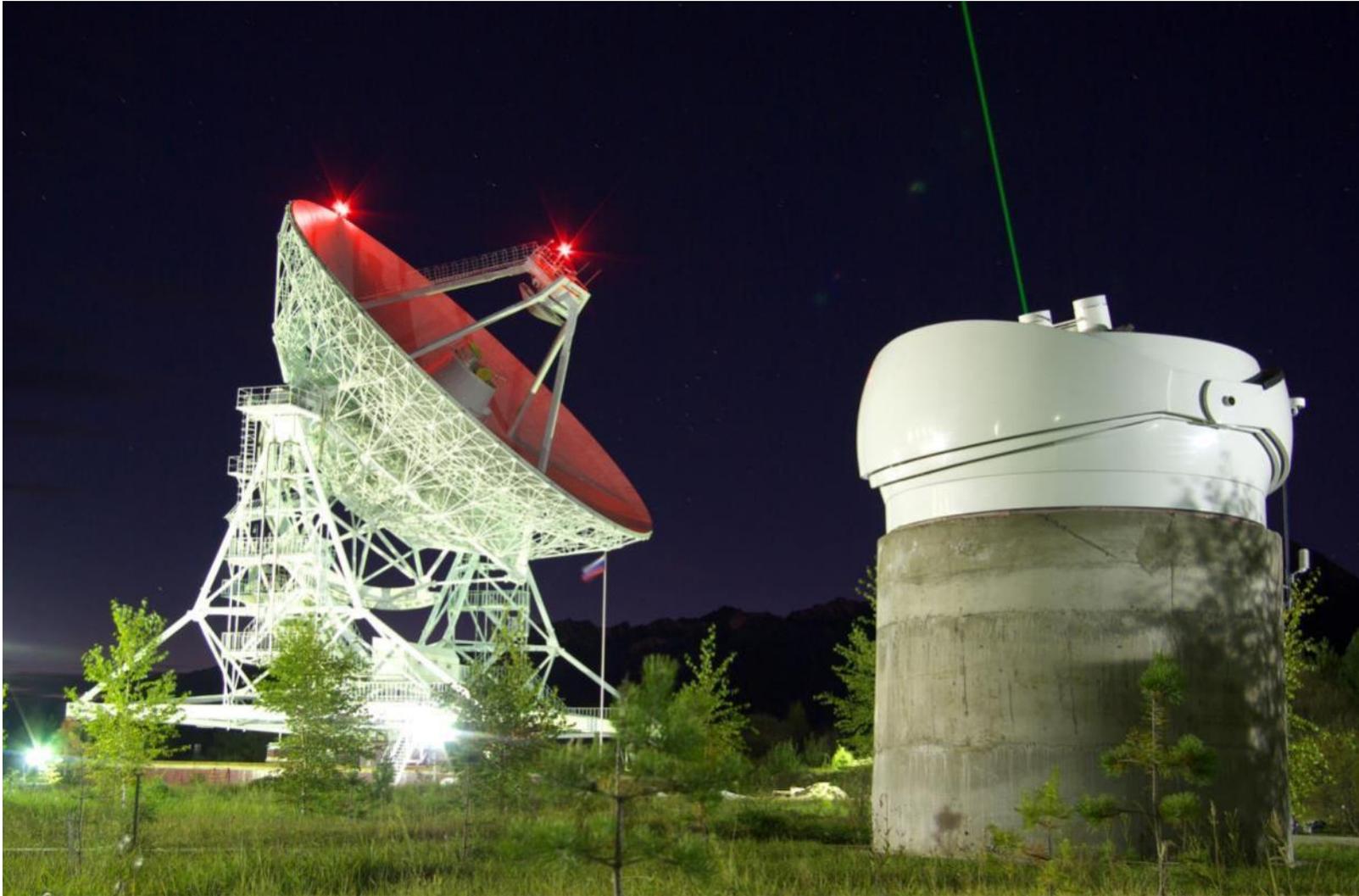
# Ishioka Geodetic Observing Station





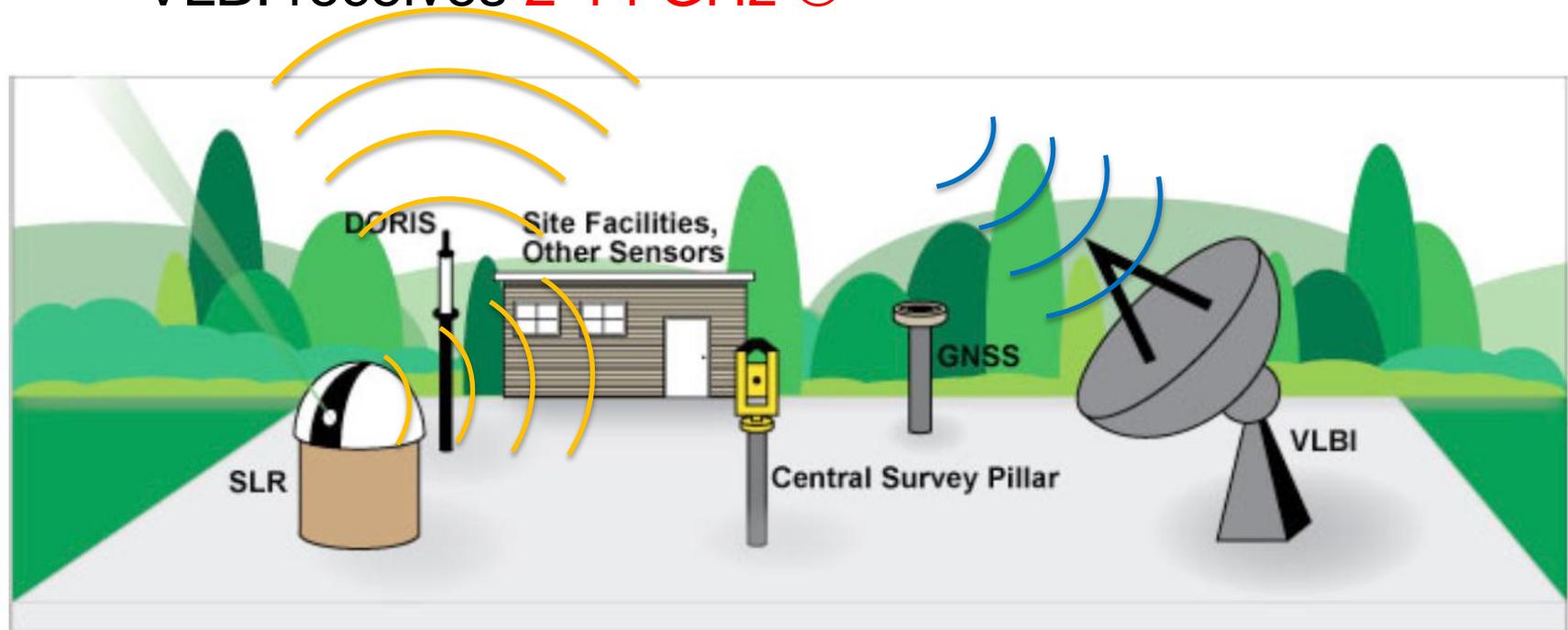
# Synergy of VLBI and SLR for GGOS

Badary (Russia)



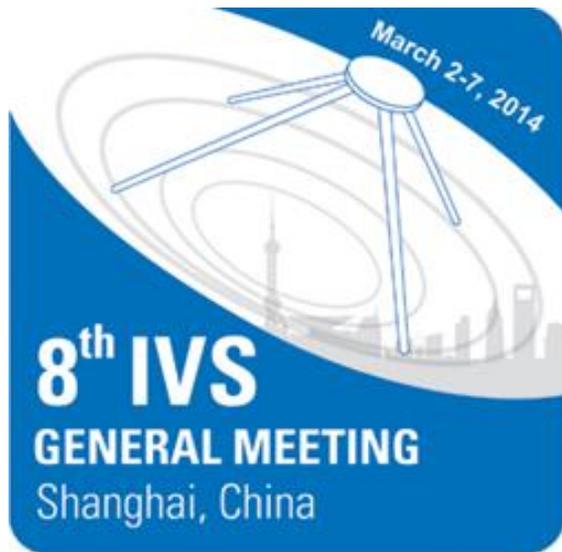
# RFI at GGOS station

- Intra-site RFI transmitted by DORIS beacon and SLR radar for aircraft avoidance
  - DORIS: 401.25 MHz, 2.036 GHz
  - SLR radar: 9.4 GHz ?
  - VLBI receives **2-14 GHz** ☹️



# Summary

- IVS is enthusiastic about VGOS.
  - Australia, Germany, Spain, Russia, ...
- Ishioka VGOS telescope in Japan
  - under construction
  - complete by March 2014
- More co-located sites of multi-technique are necessary for GGOS.
- However, intra-site RFI in the broad-band VLBI telescope should be considered.



***Thank you  
for your attention.***

**VGOS: The New VLBI Network**

